

BACKGROUND OF THE INVENTION**1 - Field of the Invention**

5 The present invention relates to the interworking of interconnected electronic equipment units. It relates more particularly to grouping equipment units to facilitate access from any unit to all the functions available in the other units.

2 - Description of the Prior Art

10 The explosion in services offered via high bit rate data transmission networks like the Internet and the multiplicity of hardware and software tools available are leading the designers of electronic equipments and in particular the designers of terminals to orient development more and more towards the environment of access to such networks.

20 The invention is therefore directed to the evolutionary interworking of equipment units, devices or terminals, which are usually heterogeneous, in the environment of access to high bit rate data transmission networks. An equipment unit can be an apparatus or a terminal already designed or adapted to use Internet solutions, employing hyperlinks, HTML (Hypertext Markup Language) presentation, client/server functions using the hypertext transfer protocol (HTTP), etc. An equipment unit can also be any type of apparatus which is very likely to evolve in the direction of hypertext operation, such as a facsimile machine, a printer, a landline or

mobile telephone, an answerphone, a MINITEL-Internet terminal (a MINITEL (registered trademark) terminal is a videotex terminal used in France), video cassette recorder, TV receiver, remote surveillance or remote metering or remote maintenance centers and more generally domestic remote control and remote surveillance systems and control and/or alarm devices communicating with them, telephone points for access to services in public places, cards or peripheral devices integrated into or connected to a microcomputer, etc.

The common management information control protocol (CMIP) and the simple network management protocol (SNMP) are currently used to administer the operation of and traffic on the Internet and in Intranets, i.e. networks linking locally grouped equipment units. The above protocols do not use hypertexts. The CMIP protocol is complex to implement and to use and is not well suited to small equipment units. The SNMP protocol used in particular for local networks leads to a very large number of regular communications between centralized administration means and a plurality of administered agent equipment units, and difficult synchronization between these equipment units. Furthermore, authentication of an agent equipment unit by the centralized administration means is not guaranteed, and "traps", i/.e. alerts transmitted by the agent equipment units to the administration means, can be lost.

Moreover in a WINDOWS (registered trademark) environment, after inserting cards corresponding to the

hardware necessary for an application on the bus of a microcomputer, "plug and play" concept enables automatic recognition of new applications, although not in accordance with hypertext principles. Integrating and/or using the application requires several interventions by the microcomputer user, to open dialog boxes and/or to run a program which can be executed. There is no automatic feature whereby a symbol such as a text or picture prompts the user to use the application. The same applies if several microcomputers with different applications are to be connected into a local network.

OBJECT OF THE INVENTION

The invention aims to remedy the shortcomings of the prior art referred to above in order to constitute an evolutionary virtual group equipment unit or terminal combining some or all of the functions available in the connected equipment units. Thanks to the invention, the functions of the equipment units of the group can be accessed from any equipment unit of the group.

SUMMARY OF THE INVENTION

Accordingly, a method of functionally linking plural primary equipment units and a manager equipment unit likely to communicate with all the primary equipment units, is characterized in that it comprises :

a preliminary step of storing presentations of equipment units in memory in the respective units or in the manager equipment unit, the presentation of each

equipment unit containing at least one link to a function of the equipment unit ; and

for linking a given primary equipment unit to the manager equipment unit and other primary equipment units already linked, the following steps:

recovering or selecting in the manager equipment unit the presentation of the given primary equipment unit,

composing a home page with the presentation of the manager equipment unit, the presentations of the other primary equipment units already linked and the presentation of the given primary equipment unit, and

downloading the home page from the manager equipment unit into all the equipment units to form a home page for all the equipment units in order that at least the primary equipment units can carry out the functions of the other equipment units.

In the context of the invention, a "link to a function of the equipment unit" can be a hyperlink enabling navigation to other pages, or a command included in a form, or a command of the equipment unit itself included in a multidimensional representation.

Interworking of grouped equipment units is possible by dynamically constituting a home page. Each of the equipment units grouped in accordance with the invention can be accessed and used from any equipment unit of the group.

Grouping the primary equipment units in accordance with the invention represents an evolution of the functions of the primary equipment units, for example

existing devices or terminals, such as MINITEL-Internet terminals, facsimile machines, telephones, TV receivers, video cassette recorders, etc. Conversely, the invention contributes to the constitution of a distributed terminal
5 based on the manager equipment unit, and also offering the functions of the primary equipment units. Pooling the available resources of all the grouped equipment units offers a set of functions at lower cost and in a more ergonomic manner.

10 The presentation of each equipment unit can include text and/or a picture evoking the equipment unit and/or at least one function executed by the equipment unit. Each presentation can be displayed in several display
15 modes, and preferably in text mode and in picture mode. The home page in each equipment unit is thus displayed in at least one of the display modes used in the equipment unit. For example, the screen of the microcomputer can display presentations in text mode and in picture mode
20 but the display of a facsimile machine can display presentations only in text mode.

More precisely, the presentation of an equipment unit in the home page includes a departure anchor of a hyperlink linked to a page of functions which is read in
25 the equipment unit and which contains links to functions of the equipment unit.

At the time of a first connection of a primary equipment unit to the manager equipment unit, an address
30 is dynamically allocated to the primary equipment unit by the manager equipment unit and is transmitted with the

home page by the manager equipment unit to the primary equipment units so that tables establishing the correspondence between the addresses of the equipment units and the presentations are updated in all the equipment units. By means of the table in a given first equipment unit, selecting the presentation of a second equipment unit in the home page displayed on the first equipment unit initializes the hyperlink between the selected presentation and the second equipment unit, for example in order to read therein a table of contents page listing functions that can be executed by the second equipment unit.

According to a variant of the invention, the step of composing a home page is effected at least partly outside the manager equipment unit in a secondary means which can be connected to the manager equipment unit via a telephone network or local network. The secondary means separate in hardware terms from the manager equipment unit, such as a server providing access to a picture base, or a video card and screen connected to the central processor unit of a microcomputer, enables more ergonomic use of the primary equipment units through a more sophisticated man-machine interface, for example.

Especially if the display means of the primary equipment units have a relatively small application area, the step of composing a home page can comprise distribution of presentations of equipment units into daughter pages and constitution of a mother page with hyperlinks to the daughter pages.

According to another variant of the invention, the

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steps of composing and downloading a home page are replaced by steps of composing home pages by the manager equipment unit and loading them into primary equipment units, each of the home pages including the presentation of the respective primary equipment unit and presentations of applications in the manager equipment unit dedicated to the respective primary equipment unit.

10 This variant is intended in particular for "individual" primary equipment units related independently of each other to the manager equipment unit managing all the equipment units of the group.

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15 According to another variant, the steps of composing and downloading are replaced by the following steps:

composing a home page with the presentations of the other primary equipment units already linked and the presentation of the given primary equipment unit, ~~and~~ ^{thereby}

20 downloading the home page from the manager equipment unit into all the primary equipment units as the home page for all the primary equipment units.

In this variant, the manager equipment unit has no screen and is assisted by secondary means separate in hardware terms from the manager equipment unit and offering the user more ergonomic and sophisticated facilities.

30 In particular, the following particular groups fall within the scope of the invention:

- the manager equipment unit and primary equipment

units are interconnected via a wireless transmission system or via a carrier current transmission system, and are respectively a terminal adapted to be connected to a telephone network and electronic devices ;

5 - the manager equipment unit and primary equipment units are interconnected via a wireless transmission system or via a carrier current transmission system and are respectively a microcomputer and terminals, the terminals being connected to a telephone network ; this
10 grouping is particularly suitable if the manager equipment unit composes home pages respectively dedicated to given primary equipment units and comprising the presentation of the respective primary equipment unit and presentations of dedicated applications in the manager
15 equipment unit, so that most of the primary equipment units have the benefit of the facilities of the improved manager equipment unit;

 - the manager equipment unit and primary equipment units are the central processor unit of a microcomputer
20 and electronic cards connected to a bus of the central processor unit.

BRIEF DESCRIPTION OF THE DRAWINGS

25 Other features and advantages of the present invention will become more clearly apparent after reading the following description of preferred embodiments of the invention, which is given with reference to the corresponding accompanying drawings, in which:

30 - FIG. 1 is a block diagram of an equipment unit group comprising a MINITEL-Internet manager equipment

unit and primary equipment units connected by a wireless transmission system;

5 - FIG. 2 is an algorithm of the method according to the invention of linking equipment units, especially at the time of the first connection of a primary equipment unit to a manager equipment unit, in reference with the first example shown in FIG. 1;

10 - FIG. 3 shows presentations of two equipment units forming a group constituting a second example of the invention;

 - FIG. 3A shows a home page displayed on a screen of one of two equipment units of the second example and table of contents pages relating to the two equipment units and displayed on the screen;

15 - FIG. 3B shows a home page shown on a display bar in the other of the two equipment units of the second example and table of contents pages relating to the two equipment units and seen on the display bar;

20 - FIG. 4 shows presentations of two equipment units forming a group constituting a third example of the invention;

25 - FIG. 4D shows a home page seen on a screen of one of two equipment units of the third example of the invention and table of contents pages relating to the two equipment units and seen on the screen;

30 - FIG. 4E shows a home page seen on a display bar of the other of the two equipment units relating to the third embodiment of the invention and table of contents pages relating to the two equipment units and seen on the display bar;

 - FIG. 5 shows presentations of four equipment

units forming a group constituting a fourth example of the invention;

- FIG. 6 shows a mother home page of the group of four equipment units relating to the fourth embodiment of the invention and two daughter home pages selected from the mother page by text mode hyperlinks;

- FIG. 7 is a block diagram of a group of three equipment units according to a fifth example of the invention;

- FIG. 8 is a block diagram of a group of six equipment units according to a sixth example of the invention;

- FIG. 9 shows home pages of four MINITEL-Internet terminals included as primary equipment units in the group of equipment units of the sixth example of the invention; and

- FIG. 10 is a block diagram of a group of six equipment units constituting a seventh example of the invention in which four primary equipment units are electronic cards.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

To explain the steps of the method of the invention better, the method is first described in detail with reference to a first embodiment shown in FIG. 1, in a wireless local transmission system conforming to the Digital European Cordless Telecommunications (DECT) standard, for example. Referring to FIG. 1, an Internet access terminal is equipped with a modem and connected by the user's telephone line to a telephone network RT. It

constitutes a base station ST connected via the local wireless transmission system to "mobile" peripheral devices such as a telephone handset CT, a facsimile machine FAX, a TV receiver-video cassette recorder TM, an answerphone RE and a decoder DTV for decoding TV signals transmitted by satellite.

In the context of the invention, the base station ST and the mobile peripheral devices CT, FAX, TM, RE and DTV constitute a group of primary equipment units EP0 to EP5. The functions of the primary equipment units are not grouped in a single apparatus but physically distributed in accordance with the principle "one apparatus = one or more functions", and the group of primary equipment units EP0 to EP5 is equivalent to a "distributed terminal". The base station ST identifies each mobile peripheral device CT, FAX, TM, RE, DTV unambiguously by exchanging digital transmission protocol signals. The base station connects a plurality of mobile peripheral devices and transmits from one mobile peripheral device to another or from the base station to one or more mobile peripheral devices. Each equipment unit using the wireless transmission technique has a channel for dialog with the base station and can open another channel to another peripheral device.

The primary equipment unit EP0 to EP5 is defined as a set of hardware and/or software means executing and/or providing independent and/or autonomous access to one or more functions of known means, such as telephone, facsimile machine, TV receiver, video cassette recorder, microcomputer card, videotex terminal, Internet access terminal, answerphone, etc. Each primary equipment unit

EP0 to EP5 can access all the functions that each other primary equipment unit of the group makes available through one or more pages including links which can be multimedia links, for example hyperlinks in the hypertext markup language (HTML) or an HTML compatible language (XML), forms with field(s) for entering information and/or check box(es) and/or button(s), VRML presentation elements, etc.

By grouping the function of access to the high bit rate data transmission network (Internet) in the base station EP0 = ST and the printing function of the facsimile machine EP2 = FAX, the facsimile function has the benefit of the much richer man-machine interface of the "MINITEL-Internet" function in the base station. World Wide Web pages received from on-line services are printed by the "MINITEL-Internet" function.

In another application, by virtue of grouping the function accessing the high bit rate data transmission network (Internet) in the base station EP0 = ST and the TV signal decoding function in the decoder EP5 = DTV, the decoder DTV intentionally simplified, in that it has no keyboard and/or screen or has a simplified keyboard and/or screen, uses in the man-machine interface of the base station the card reader of the MINITEL-Internet terminal and its facilities for access to the Internet for e-commerce activities, or to download entitlements and/or a pay per view transaction in order to view a selected film on the TV receiver-video cassette recorder EP3 = TM, for example.

To provide the evolutionary interconnection of the

primary equipment units EP0 to EP5 in accordance with the invention, irrespective of the methods or means of connecting the primary equipment units, such as a radio link, an appropriate protocol layer or a few protocol elements are inserted into the primary equipment units. Dynamic Host Configuration Protocol (DHCP) elements with Requests For Comments (RFC 1541) are suitable. Each primary equipment unit includes at least one "home page dynamic composition assistance interface" i.e. hardware and software means needed to poll the primary equipment unit and to transmit an Internet protocol (IP) address allocation request from the primary equipment unit.

The home page dynamic composition assistance interface in a primary equipment unit is used when adding the primary equipment unit to the group or when adding any other primary equipment unit to the group.

One of the primary equipment units EP0 to EP5, referred to hereinafter as the **manager equipment unit EM**, includes a "home page dynamic composition" interface used on a one-off basis to recognize and associate equipment units to be grouped by allocating IP addresses and constituting a group home page PG. Alternatively, the interface defining the manager equipment unit is partly functionally displaced to a secondary equipment unit and has tasks executed or activated from the dedicated secondary equipment unit. The secondary equipment unit is accessible via the telephone network RT or a local network intended for grouping primary equipment units but not itself forming any part of the primary equipment units to be grouped. Alternatively, the interface defining the manager equipment unit has

tasks executed or activated through an on-line service, such as a server, gateway, conjugate, etc., accessible via the telephone network RT.

5 The "home page dynamic composition assistance" and "home page dynamic composition" interfaces are included in the manager equipment unit if it is a primary equipment unit of the group concerned.

10 In the remainder of the description the base station EM-EP0=ST in the group shown in FIG. 1 is equipped as a manager equipment unit EM.

15 As shown in FIG. 2, the method in accordance with the invention of functionally linking equipment units comprises eight main steps ET0 to ET7 which essentially relate to adding any of the primary equipment units EP1 to EP5, hereinafter denoted EPi, where i is an integer from 1 to 5, to the group comprising at least the manager equipment unit EM.

20 According to one feature of the invention, a primary equipment unit EPi is identified by a presentation PRi which characterizes the equipment unit globally. All remarks hereinafter relating to the presentation PRi of the equipment unit EPi can be applied
25 to the presentation PR0 of the manager equipment unit EM = EP0.

30 A photograph of the equipment is a very simple way to identify it and is a presentation well suited to a consumer environment. For example, the presentation is stored in various sizes and/or in various formats and/or in more or less detail, according to the principal uses

offered by the equipment unit. Alternatively, the presentation is the general table of contents page of the main applications or functions available in the primary equipment unit, or a form including text boxes to be filled in and a link, in the sense in which this term is employed in the context of the invention, for example a command such as "SEND".

A presentation of any given primary equipment unit presents its presentation in one or more links so that each link constitutes a pointer in each equipment unit, i.e. a departure anchor which the user selects or clicks to specify an address of a new page read in said given primary equipment unit, or the command from the menu of a function to be executed in said given primary equipment unit. For example, the address is an arrival anchor of the table of contents page listing the functions available in said given primary equipment unit.

The links in the presentation of the given primary equipment unit are internal links in the given primary equipment unit but external links in the other equipment units.

In the context of the invention, the links can be hyperlinks which have departure anchors and arrival areas, addressed by arrival anchors, which are principally in text mode, i.e. include alphanumeric characters, and/or in picture mode, for example including a diagram, a logotype or a photograph identifying the equipment, and/or can be multidimensional representations or icons for controlling functions, or a multimedia link from a frame in which a video sequence runs. The characters and/or image(s) can be associated with sound

and/or a video sequence, or words in a sound sequence or pictures in a video sequence can themselves be departure anchors of hyperlinks or commands. For example, the departure anchor of an audio hyperlink to a sound sequence presenting a list of functions can be a chosen word spoken into a microphone after several presentation words have been reproduced by a speech synthesizer. Thus the various hyperlink modes confer the multimedia character on the links.

10 If a primary equipment unit E_{Pi} is not capable of managing or interpreting all the aforementioned link modes itself, it provides other primary equipment units of the group with a possibly richer presentation P_{Ri} including, for example, at least the two main link modes, 15 i.e. a text mode link and a picture mode link.

The presentation P_{Ri} is designed and stored in resident memory in the equipment unit E_{Pi} in step E_{T0}. Either it is designed and loaded initially by the manufacturer of the equipment unit or it is designed, 20 modified and/or completed by the user of the equipment unit, by means of downloading or manual input by the user, for example. Alternatively, the presentations P_{R1} to P_{R5} of the equipment units E_{P0} to E_{P5} are designed and stored at least in part in the manager equipment unit E_M.

25 Alternatively, however, it is important for a manufacturer of a primary equipment unit E_{Pi} to prohibit updating of the presentation P_{Ri} of the equipment unit and to protect it by registering it. In this case, the primary equipment unit refuses to consider a page, such 30 as a home page, composed in another equipment unit and the associated hypermedia operation if the primary

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equipment unit does not recognize in the constituted home page, or in a "daughter" page if the constituted home page is in a hierarchy of several pages, the "signature" of the presentation that it has just made available, for example. To be more precise, the primary equipment unit refuses to consider an arrival anchor of a hyperlink whose origin is a pointed departure anchor in a home page which is not the presentation of the primary equipment unit.

The first linking step proper ET1 consists of "connecting" a given primary equipment unit E_{Pi} for the first time to the manager equipment unit EM. In the first embodiment of the invention, shown in FIG. 1, the equipment unit E_{Pi} , which is a mobile peripheral device, reports its presence in the coverage area of the equipment unit EM, which is the base station.

The "pairing" of the manager equipment unit EM and the given primary equipment unit E_{Pi} begins in step ET2 with a request for **dynamic allocation of an address** I_{Pi} transmitted in accordance with the DHCP to the given primary equipment unit E_{Pi} by the manager equipment unit so that in the next step ET3 the manager equipment unit can recover, or select and send the presentation PR_i of the given primary equipment unit E_{Pi} .

More generally, the manager equipment unit allocates respective different addresses to the primary equipment units EP_0 to EP_5 as and when they are functionally linked. The addresses are stored in an "addresses I_{Pi} / presentations PR_i " correspondence table. The manager equipment unit is then able to access the

higher IP or TCP/IP layers of the linked primary equipment units.

Each equipment unit is structured as a client/server identified by its address I_{Pi}. It includes
5 a browser based on its display and/or designation characteristics: text only, text and pictures, etc.

The grouping of equipment units is chosen by a user to limit the number of equipment units grouped and/or to define rights of or conditions on use of each equipment
10 unit, etc.

If a primary equipment unit to be added to the group already includes a "home page dynamic composition assistance" interface and a "home page dynamic composition" interface, i.e. the "primary equipment unit"
15 function and the "manager equipment unit" function, the "home page dynamic composition" interface is manually disabled and/or disables itself if the primary equipment unit to be added is not the initiator of the equipments and/or if the equipment unit already declared as the
20 manager equipment unit asks it for its presentation, for example, in order to prevent conflicts between plural manager equipment units in the group.

After climbing successively or simultaneously
25 through the physical layers enabling it to communicate data with the given primary equipment unit E_{Pi} at the start of the next step ET₃, the manager equipment unit EM **recovers** by downloading **the presentation** P_{Ri} of the primary equipment unit E_{Pi}. In particular the text
30 and/or picture presentation of the primary equipment unit E_{Pi} in HTML hypertext or in a compatible language such as

XML are recovered, together with each link included in the presentation PRi and providing access to an object, for example a table of contents page of functions, or directly to a function of the primary equipment unit Epi, by means of an input URL (Uniform Resource Locator) address that contains information on the route to the object. More generally, the presentation recovered is a multimedia presentation, i.e. one containing links in text, picture, video and sound modes.

The presentation PRi of the given primary equipment unit Epi is associated, as a file, with the address Ipi of the given primary equipment unit Epi. The "addresses Ipi / presentations PRi" correspondence table is therefore updated in the manager equipment unit EM.

In the next step ET4, the manager equipment unit EM either composes a group **home page** PG with the presentation PRO of the manager equipment unit EM and the presentation PRi if the given primary equipment unit Epi is the first to be linked to the manager equipment unit, or uses the presentation PRi of the given equipment unit to complete a home page already constituted with the presentation PRO and the presentations of primary equipment units already linked. In the group home page PG, which is an HTML or VRML page, for example, the presentations PRi correspond to the addresses Ipi stored in the aforementioned table and needed for client/server working. The primary equipment units are dynamically meshed by creating or deleting the home page.

As a general rule the manager equipment unit EM composes the home page in two modes, a text mode and a

picture mode, each of which can be associated with sound and/or video.

The text mode home page contains the texts of the presentations of the primary equipment units automatically placed relative to each other in the home page in accordance with a predetermined browser program resident in the "home page dynamic composition" interface of the manager equipment unit. For example, text mode presentations are presented successively from top to bottom as and when primary equipment units are added, with external HTML hypertext links constituted of underlined words or groups of words representative of primary equipment units ; a text mode presentation can include the designation of the equipment unit immediately followed by a list of a few words associated with functions that can be executed by the equipment unit concerned.

The picture mode welcome page contains the pictures of the presentations of the equipment units automatically placed relative to each other in the home page in accordance with the predetermined browser program resident in the manager equipment unit. For example, picture mode presentations are presented successively from right to left and from top to bottom as and when primary equipment units are added. The picture mode presentation of an equipment unit includes at least one picture mode link consisting of a picture or a video sequence, for example, inside a colored frame and representative of the primary equipment unit. The framed picture is a picture which can be clicked on, and is also referred to as a reactive picture.

Alternatively, another mode of the home page combines the words and pictures of the presentations. For example, each presentation combines an equipment unit picture and/or function pictures with an equipment unit text word and/or function text words and/or, in another variant, with an equipment unit sound word and/or function sound words.

In another variant, each mode of the presentation is organized as an array of cells whose size is adjusted automatically, the cells being allocated respectively to the presentations of the primary equipment unit.

Then, in step ET5, the manager equipment unit EM **downloads** at least the presentation PRi of the equipment unit Epi and preferably the group home page PG composed at least in accordance with the text and picture modes in all the primary equipment units EP0=EM to EP5. The home page previously stored in the primary equipment units already linked in the group is automatically deleted, or alternatively, is updated. The "addresses Ipi / presentations PRi" correspondence table is also downloaded by the manager equipment unit EM for updating in all the primary equipment units EP1 to EP5.

The home page of the primary equipment units EP0=EM to EP5 grouped in this way constitutes the presentation of a group equipment unit formed by juxtaposing the presentations of the grouped primary equipment units. The group equipment unit can constitute a primary equipment unit to be added to another group, which consequently has more functions. The presentation of the group equipment unit is a hyperlink representative of the

group EP0=EM to EP5 and/or the set of links respectively representative of all the equipment units included in the group EP=EM to EP5. In this case, in step ET5, the group home page PG is also downloaded in the manager equipment unit of said other group for circulation to the primary equipment units in said other group.

In response to the group home page PG, each primary equipment unit EP0=EM to EP5 selects the **home page display mode** most compatible with its display characteristics in step ET6. For example, if the display in the primary equipment unit has only text mode, the home page displayed contains only text; if the display is also possible in picture mode, the home page displayed contains only the picture, or combined text and picture.

Selectively clicking on the departure anchor of an internal link included in the presentation of a primary equipment unit E_{Pi} and shown in the home page loaded in the primary equipment unit E_{Pi} provides access to the table of contents of functions, or selects one of the functions of the primary equipment unit E_{Pi}, for example. Selectively clicking on the departure anchor of an external link in the home page loaded in the primary equipment unit E_{Pi} selects the presentation of another primary equipment unit providing access to the table of contents list of the functions of that other primary equipment unit, for example, or to one of the functions of that other primary equipment unit. This selective clicking enables any primary equipment unit to obtain the benefit of some or all of the functions available in the other equipment units of the group. Reciprocally, the

primary equipment unit E_{Pi} can be accessed and used from any other equipment unit of the group.

One or more links at the level of the functions of the primary equipment unit are used to return to the home page common to the equipment units or to access the function of another equipment unit. These links are established by the primary equipment unit itself in response to receiving the common home page.

Then, in the final step ET7, the cycle of preceding steps is repeated each time that a primary equipment unit must be added to the existing group. The manager equipment unit EM completes the home page with the presentation of the primary equipment unit and downloads it into all the primary equipment units, and each primary equipment unit of the group substitutes the completed home page for the old home page, or updates the old home page. The group of primary equipment units $E_{P0}=EM$ to E_{P5} is therefore progressively enriched in a manner that can be modulated by adding functions available in primary equipment units recently added to the group.

In the foregoing example, the relationship between the manager equipment unit $E_{P0} = EM$, the base station and the primary equipment units E_{P1} to E_{P5} , the mobile peripheral devices, constitutes the equivalent of a mini-Intranet. The set of equipment units to be associated and/or grouped dynamically into a local network is chosen and/or defined by virtue of this mini-Intranet concept.

Once linked, the given primary equipment unit E_{Pi} accesses information available in another equipment unit

of the group by using the HTTP transport protocol. However, to prevent establishing a connection between these two equipment units for each object searched, the link between the two equipment units is maintained, in order to transfer all of the objects from the same page. Elements with different formats, such as processed texts, accented characters, pictures, sounds, video, etc. are transmitted in accordance with the Multipurpose Internet Mail Extensions (MIME) specification so that any equipment unit can communicate with any other equipment unit. Equipment units communicate in TCP/IP mode.

Each equipment unit can be equipped with similar or different browsing/selection elements, namely mouse, keyboard, touch-sensitive screen, speech recognition, joystick, selection/designation by combination/movement cursor/keyboard enter key, and interface working by assigning a rank to the links or other identifiers.

Although each equipment unit has its own man/machine interface, the client equipment unit accesses the whole or a group of equipment units in this way using the equipment unit whose man/machine interface suits it best, i.e. the equipment unit which is most ergonomic, providing screen, keyboard, mouse, etc. This has the advantage of enriching, in a manner that can be modulated, in particular by substitution, the functions offered to the client equipment unit and/or proposes a simplified range of equipment units with simplified keyboard and/or screen, knowing that difficult operations can be effected with maximum ergonomics and/or user-friendliness and/or security via a more sophisticated equipment unit, such as a microcomputer, an Internet

access terminal, etc.

The nature of and the means for linking the equipment units of the group to each other can be different, such as cable connections, GSM or DECT wireless connections, or carrier current connections, for example. However, because the equipment units have similar functions relative to the HTML hypertext code and the browser, the invention makes it possible, for example, to program the video cassette recorder in the equipment unit EP3=TM using facilities in the manager equipment unit EM=ST, to print a Web page currently being consulted in the equipment unit EM via the facsimile machine EP2=FAX, or to program a central heating controller using the keypad of the remote controller of a "TV receiver + remote control" equipment unit, etc.

Other examples to carry out the method according to the invention oriented to linking a small number of equipment units with sets of functions known in the art are described hereinafter. In the presentations of the following examples the words underlined and the pictures referred to as reactive pictures are departure anchors of HTML hyperlinks to equipment units or to pages or functions relating to equipment units.

In a **second example**, two primary equipment units A and B have the presentations PRA and PRB shown in FIG. 3. The equipment unit A is a MINITEL-Internet terminal which incorporates a screen and operates as a manager equipment unit. It has stored in memory a presentation PRA in the "MINITEL-Internet" text mode, and the picture mode for a

photograph of the equipment unit A. The equipment unit B is a Galeo 2610 three-function telephone which incorporates a display bar with three lines of text, and has stored in memory a presentation PRB in the "Galéo 2610 (Telephone, Fax, Answerphone)" text mode, and the picture mode for a photograph of the equipment unit B. The text mode presentation PRB therefore includes a hypertext designation of the equipment unit B and three words identifying functions that can be effected by the equipment unit B.

The equipment units A and B are grouped in a group equipment unit AB whose home page in HTML hypertext is composed by the manager equipment unit A as a function of the presentations PRA and PRB read in the memories of the equipment units A and B. Thanks to the invention, the group equipment unit AB offering the functions of the two equipment units A and B is usable from the equipment unit A and/or from the equipment unit B and/or from an equipment unit external to the group AB if that external equipment unit and the group equipment unit AB are included in another group. The functions of the equipment unit AB thus constituted are accessible via hyperlinks both from the equipment unit A and from the equipment unit B.

The screen of the equipment unit A can display reactive or non-reactive pictures contained in HTML pages. The equipment unit AB from the equipment unit A can therefore be used in text and/or picture mode.

As shown in FIG. 3A, the home page AB/A of the group equipment unit AB seen from the equipment unit A is made up of two picture mode hyperlinks in the

presentations PRA and PRB read in the equipment units A and B. In the home page AB/A the presentations are arranged from right to left and from top to bottom, or alternatively in alphabetical order, for example, and their arrangement is imposed by the manager equipment unit A. Designating/selecting, i.e. double clicking on the top picture PRA on the home page AB/A of the equipment unit AB seen on the screen of the equipment unit A, for example by means of a mouse of the equipment unit A, provides access to the initial home page A/A of the equipment unit A which can itself have an HTML presentation made up of links in text mode and in picture mode. Designating/selecting the bottom picture PRB in the home page AB/A of the equipment unit AB seen from the equipment unit A provides access to the initial home page B/A of the equipment unit B, but preferably presented with pictures because the presentation of the table of contents of the equipment unit B has internal links in text mode and in picture mode.

The display bar of the equipment unit B can display only text and a few particular graphic symbols. The equipment unit AB can therefore be used from the equipment unit B only in text mode.

As shown in FIG. 3B, the home page AB/B of the group equipment unit AB seen from the equipment unit B is constituted of an text mode presentation external hyperlink "MINITEL-Internet" to the equipment unit A, a text mode presentation internal hyperlink "Galeo 2610", and three text mode internal table of contents links "(Telephone, Fax, Answerphone)". The presentations PRA and PRB are arranged in the home page AB/B from top to

bottom or alternatively in alphabetical order, for example, and their arrangement is imposed by the primary equipment unit B. Designating/selecting "MINITEL-Internet", for example by using an up arrow key and an enter key of the equipment unit B, provides access to the home page [A/B] of the equipment unit A read in text mode without picture. Designating/selecting "Galéo 2610" using the up arrow and enter keys of the equipment unit B provides access to the home page [B/B] of the equipment unit B. This is the same as the original operation of the equipment unit B with HTML pages displayed with no picture.

In the embodiment shown, the equipment unit B has a display bar with only three lines, and so only part of the home page [A/B], [B/B] can be displayed on the equipment unit B. It is necessary to scroll vertically through the lines of the display bar of the equipment unit B using the up arrow key to read all of the home page [A/B], [B/B] as shown at A/B, B/B in FIG. 3B.

In a **third example**, two primary equipment units D and E have the presentations PRD and PRE shown in FIG. 4. The equipment unit D is a remote surveillance terminal which incorporates a screen and operates as a manager equipment unit. It has stored in memory a presentation PRD "Remote Surveillance Center" in text mode, and in picture mode for a photograph of the equipment unit D. The equipment unit E is a device for monitoring and controlling a domestic central heating installation, includes a display bar which can show four lines of text, and has stored in memory a presentation PRE "Heating

control" in text mode, and in picture mode for a photograph of the monitoring and controlling device.

The equipment units D and E are grouped into a group equipment unit DE whose home page in HTML hypertext is composed by the management equipment unit D as a function of the presentations PRD and PRE read in the memories of the equipment units D and E. Thanks to the invention, the group equipment unit DE offering the functions of the two equipment units D and E is usable from the equipment unit D and/or from the equipment unit E and/or from an equipment unit external to the group DE if the external equipment unit and the group equipment unit DE are included in another group. The functions of the equipment unit DE thus constituted are accessible via hyperlinks both from the equipment unit D and from the equipment unit E.

The screen of the equipment unit D can display reactive or non-reactive pictures contained in HTML pages. The equipment unit DE from the equipment unit E can therefore be used in text mode and/or picture mode.

As shown in FIG. 4D, the home page DE/D of the group equipment unit DE seen from the equipment unit D is made up of two picture mode hyperlinks in the presentations PRD and PRE read in the memories of the equipment units D and E. The presentations are arranged in the home page DE/D from right to left and from top to bottom or alternatively in alphabetical order, for example, and their arrangement is imposed by the manager equipment unit D. Designating/selecting, i.e. double clicking on the right-hand picture PRD in the home page DE/D of the equipment unit DE seen from the equipment

unit D, for example by means of a mouse of the equipment unit D, provides access to the initial home page D/D of the equipment unit D which can itself have an HTML presentation made up of links in text mode and picture mode. Designating/selecting the left-hand image PRE in the home page DE/D of the equipment unit DE seen from the equipment unit D provides access to the initial home page E/D of the equipment unit E but presented only with text and text mode links because the presentation of the table of contents of the equipment unit E does not have internal links in picture mode. Alternatively, the presentation PRE and the links in text mode in the home page E/D are accompanied by arrival anchors designating respective synthesized sound messages.

The display bar of the equipment unit E can display only text and a few particular graphic symbols. The equipment unit DE can therefore be used from the equipment unit E only in text mode.

As shown in FIG. 4E, the home page DE/E of the group equipment unit DE seen from the equipment unit E is made up of a text mode presentation external hyperlink "Remote Surveillance Center" to the equipment unit D and a text mode presentation internal hyperlink "Heating control". The presentations PRD and PRE are arranged in the home page DE/E from top to bottom or alternatively in alphabetical order, for example, and their arrangement is imposed by the primary equipment unit E. Designating/selecting "Remote Surveillance Center", for example using an up arrow key and an enter key of the equipment unit E, provides access to the home page [D/E] of the equipment unit D read in text mode without

picture. Designating/selecting "Heating control" using the up arrow and enter keys of the equipment unit E provides access to the home page [E/E] of the equipment unit E. This is the same as the original operation of the equipment unit E with HTML pages displayed with no picture.

In the embodiment shown, the equipment unit E has a display bar with four lines, and so only part of the home page [D/E], [E/E] is displayed on the equipment unit E. It is necessary to scroll vertically through the lines of the display bar of the equipment unit E using the up arrow key to read the whole of the home page [D/E], [E/E] as shown at D/E, E/E in FIG. 4E.

In a **fourth example**, the previous primary equipment units A, B, D and E are grouped in a group equipment unit ABDE. The group equipment unit ABDE offering the functions of the four equipment units A, B, D and E is, by virtue of the invention, usable from the equipment unit A and/or from the equipment unit B and/or from the equipment unit D and/or from the equipment unit E and/or from an external equipment unit if that external equipment unit and the group equipment unit ABDE belong to another group. The functions of the equipment unit ABDE constituted in this way can be accessed via hyperlinks from any of the equipment units A, B, D and E.

In this fourth example, the equipment units A and D are equipped with a screen for displaying reactive and non-reactive pictures contained in HTML pages. One of the equipment units A and D is the manager equipment unit of the group which composes the home page in HTML

hypertext of the group equipment unit ABDE in accordance with presentations PRA, PRB, PRD and PRE read in the equipment units A, B, D and E. The equipment unit ABDE can therefore be used from the equipment unit A or D in text mode and/or in picture mode.

As shown in FIG. 5, the home page ABDE/AD of the group equipment unit ABDE seen from the equipment unit A or D is constituted of four picture mode hyperlinks in the presentations PRA, PRB, PRD and PRE read in the memories of the equipment units A, B, D and E. Designating/selecting the "home" picture or the "fax" picture, i.e. double clicking on the bottom right-hand picture PRE or bottom left-hand picture PRB in the home page ABDE/AD of the group equipment unit ABDE seen from the equipment unit A or D, using the mouse of the equipment unit A or D, provides access to the initial home page (table of contents) of the primary equipment unit E or B, which can itself be an HTML presentation made up of links in text mode or in picture mode if the presentation of the table of contents of the equipment unit E or B has internal links in text mode and in picture mode.

The equipment units B and E being each equipped with a display bar for displaying only text and a few particular graphic symbols, the home page ABDE/BE of the group equipment unit ABDE seen from the equipment unit B or E is made up of four text mode hyperlinks in the presentations PRA, PRB, PRD and PRE read in the equipment units A, B, D and E. FIG. 5 shows only three presentations PRD, PRE and PRA because the display bars in the equipment units B and E have only three lines for

links.

In a variant shown in FIG. 6, to avoid some of the hyperlinks not being presented directly to the user, as in the display bar shown in FIG. 5, which is lacking the "Fax Galéo 2610" hyperlink designating the equipment unit B, a "mother" hypertext page and a plurality of intermediate "daughter" hypertext pages are formed in accordance with functions of the same nature, for example: home, telecommunication. To enable use of the group equipment unit ABDE from the equipment unit B or E, the "mother" hypertext page M/BE includes the departure anchors "Home" and "Telecommunication". Selecting the start anchor "Home" provides access to a daughter hypertext page F1/BE which is directed toward the hyperlinks relating to the home of the user, i.e. toward the text mode presentations of the equipment units D and E: "Remote Surveillance Center", "Heating control". Selecting the departure anchor "Telecommunication" provides access to a daughter hypertext page F2/BE which is directed toward the hyperlinks relating to telecommunication services offered to the user, such as the text mode presentations of the equipment units A and B: "MINITEL-Internet", "Fax Galéo 2610".

In another, similar variant, "mother" page and "daughter" page(s) are constructed in picture mode, for example when pictures of the presentations of the primary equipment groups, i.e. the equipment units that have been grouped, are too many, or the pictures of the presentations are too large to be shown on the same screen. "Mother" page and "daughter" page(s) are constructed by some or all of the linked equipment units

or by means of an on-line service offering a picture bank, for example.

5 In a **fifth example**, equipment units are used completely if each equipment unit already and autonomously provides access to its functions via links.

10 If equipment units E1, E2 and E3 are already associated in a group in accordance with principles different from those of the invention, to form a group equipment unit E123 such as a remote surveillance device, to be able to access each of the equipment units of the group it may be sufficient to adapt only one of the equipment units to form a primary equipment unit in accordance with the invention. The primary equipment
15 unit is preferably the equipment unit of the group which has the biggest list of functions.

Referring to FIG. 7, the equipment unit E1 is an alarm center constituting the primary equipment unit of the group E123 and serves the equipment units E2 and E3,
20 such as a sensor and a video camera which have retained their initial operation and do not include any "home page dynamic composition assistance" or "home page dynamic composition" interface. The equipment unit E1 is also a primary equipment unit included in a second group E145.
25 The second group further includes a MINITEL-Internet terminal including a screen and serving as a manager equipment unit E4 and a TV receiver provided with a video cassette recorder as a primary equipment unit E5, which are connected to the equipment unit E1.

30 In accordance with the invention, the sensor E2 and the video camera E3 are controlled and monitored from the

equipment unit E1 or from the equipment unit E4 or from the equipment unit E5.

In a **sixth example** shown in FIG. 8, a centralized manager equipment unit MO and primary equipment units I and EPR1 to EPR4 in accordance with the invention are respectively a microcomputer, a printer and "MINITEL-Internet" terminals or network microcomputers (Net-computers) interconnected by a DECT wireless transmission system. The equipment units EPR1 to EPR4 are served by a telephone network RT, in particular for access to the Internet (WEB, E-Mail, News, etc), and can communicate with the centralized equipment unit MO and the printer I by means of the features of the invention.

The manager equipment unit MO in this example is regarded as a resource containing a plurality of predetermined applications made available to the equipment units EPR1 to EPR4. Presentations TT, DI respectively associated with the applications are stored in memory in the manager equipment unit MO. The application presentation TT is a departure anchor of a hyperlink or a picture mode command and takes the form of a framed image of the letter W on a sheet of paper for the word processing application transposed into HTML and vice versa. The other application presentation DI is also a departure anchor of a hyperlink or a picture mode command and takes the form of a framed picture of a disk for a virtual disk space application, for example a reserved virtual disk. The manager equipment unit MO has also acquired presentations PRI and MI1 to MI5 read in the primary equipment units I and EPR1 to EPR4.

Under the control of the user, for example, the manager equipment unit MO groups in accordance with the invention four predetermined applications such as MINITEL-Internet MI, word processing TT, reserved disk space DI and printing PRI on four virtual terminal type workstations T1 to T4: $T1 = (MI1+TT1+DI1+PRI)$, $T2 = (MI2+TT2+DI2+PRI)$, $T3 = (MI3+TT3+DI3+PRI)$ and $T4 = (MI4+TT4+DI4+PRI)$, the workstation $Tj = (MIj+TTj+DIj+PRI)$ being dedicated to the primary equipment unit $EPRj$, where j is an integer from 1 to 4.

In step ET4 in FIG. 2, the manager equipment unit MO composes home pages $EPR1/T1$ to $EPR4/T4$ respectively corresponding to the workstations T1 to T4, as shown in FIG. 9, and downloads them into the primary equipment units T1 to T4, respectively. The home page loaded into the primary equipment $EPRj$ includes the presentation MIj of the equipment unit $EPRj$, the two presentations of the applications offered by the manager equipment unit MO, and the presentation PRI of the printer I, i.e. the four applications of the workstation Tj .

Each of the applications of the workstation Tj cooperates with any other application of the workstation Tj . Accordingly, composing documents on the word processor, saving files corresponding to those documents in a virtual disk space on the hard disk of the manager equipment unit MO, printing those files by the printer I, and accessing services via the Internet with the facility to save and/or print information pages consulted can be initialized from each primary MINITEL-Internet equipment unit $EPRj$ by respectively clicking on the presentations TTj , DIj , PRI and MIj displayed on the home page $EPRj/Tj$.

The configuration of the equipment units used in the sixth example is particularly suitable for a school environment. The manager equipment unit MO has a high cost and is under the responsibility of a teacher, and provides resources such as a word processing, a hard disk and printing to a large number of primary equipment units EPR1 to EPR4 having a much lower unit price and available to a greater number of pupils.

In FIG. 10, the manager equipment unit is the central processor unit UC of a microcomputer to be grouped with primary equipment units C1 to C4 and IM which store in memory respective presentations conforming to a **seventh example** of the invention. The primary equipment units C1 to C4 are electronic cards connected to a bus BU of the central processor unit UC of the microcomputer, manage respective applications and have in resident memory presentations PRC1 to PRC4 in picture mode at least of the respective applications, as shown on the screen of the microcomputer EC connected to the central processor unit UC in FIG. 10. For example, the equipment unit C1 manages an application for digitizing photographs, the equipment unit C2 manages a CD-ROM drive controller application, the equipment unit C3 manages a centralized domestic heating control application, and the equipment unit C4 manages a games console application. The primary equipment unit IM has a picture mode presentation PRIM and is a printer connected to one serial port of the central processor unit UC.

In this seventh example, there is no point in the central processor unit UC of the microprocessor of the